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Defining the grazing season of restored natural grasslands

Abstract

Grazing native plants is common in the western United States, but the limited amounts of grazing land in Iowa are dominated by exotic, cool-season grasses and legumes. This study explored the nutritional quality and yields of reconstructed native plant grassland and prairies.

Keywords

Agronomy, Animal management and forage, Conservation practices

Disciplines

Agronomy and Crop Sciences | Natural Resources and Conservation

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Abstract: Grazing native plants is common in the western United States, but the limited amounts of grazing land in Iowa are dominated by exotic, cool-season grasses and legumes. This study explored the nutritional quality and yields of reconstructed native plant grassland and prairies.

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Whiterock Conservancy)

Co-investigators:
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Agronomy
Iowa State University

Budget:
\$6,428 for year one
\$5,015 for year two

Q Can grazing and conservation land management be mutually beneficial?

A Yes, grazing and land management can be employed to create successful land use management plans that incorporate both conservation and grazing goals.



ECOLOGY

Background

Grazing cattle on reconstructed prairies is a solution proposed by land managers and grazers in Iowa to the problem of meeting multiple conservation goals. It allows for incorporating perennial, native plants into the Iowa landscape while maintaining the productivity and profitability of the state's agricultural lands.

Whiterock Conservancy, a 5,400-acre nonprofit land trust in west-central Iowa, was created by the Roswell Garst family in 2004. The mission of the conservancy is to foster a "resilient and self-renewing Iowa landscape" and grazing research that would assist cattle producers was a good fit with that goal. In addition to researching solutions that would work on the conservancy lands, the hope is that the knowledge will be useful to a broader audience.

The objectives were to collect and analyze the forage value of the vegetative component of a reconstructed species-diverse prairie, restored oak savanna and lower diversity warm-season reconstructed prairie across two growing seasons. The information would be used to build a "calendar" that tracks the progression of biomass availability and forage value of the three non-pasture habitat types. The project team sought to understand the nutritional quality and forage quantity of these habitats, and how it changes during the growing season. This will allow producers to better integrate cattle grazing into ecological management of these areas.

Approach and methods

The researchers surveyed the agronomic potential of the land on the basis of the biomass yield and forage quality basis. After assessing the agronomic information, they compared the agronomic findings to animal nutrition data and livestock scenarios. Agronomic, livestock nutrition, ecological and economic data were shared with stakeholders in the Whiterock Conservancy project to develop a management plan.

Two areas at Whiterock Conservancy were identified as target areas for research on grazing. The first area was warm season grassland with low-diversity warm-season grass mixtures and the second was reconstructed prairie with high diversity warm-season grass species.



Cattle in a reconstructed prairie

Results and discussion

The results from this study suggest that crude protein and total digestible nutrient needs of beef cows can be met very early in the growing season. However, from June onward, only total digestible nutrients in the prairie forages were sufficient to meet livestock needs. At no point in the season was the dry matter intake requirement of the cattle met. Despite these results, a handful of producers in Iowa and many producers in the south and west parts of the United States have a forage base dominated by warm season grasses and prairie species and are able to maintain their cattle with proper body conditioning scores and achieve profitable enterprises.

Though the nutrient requirements are not met based on these results, other interpretations may exist to support establishment of a functioning grazing system. The samples analyzed in this study were clipped from prairies, which may not represent the actual nutritional intake of the animals as they may select for higher quality forages in a diverse stand. Clipped samples represent all plant material, not necessarily what an animal will selectively graze or consume, which is dependent on what grazing system is being used for the livestock.

In addition, when comparing prairie forage to the typical cool-season grass pasture forages used in Iowa, a typical Iowa pasture will exceed the protein needs of cattle throughout the growing season, but total digestible nutrient levels are less than the cattle needs through the entire season. Though cool-season pastures meet some of the season-long nutritional needs for cattle, the pasture production tends to decline during the high summer temperatures of July and August and may produce little forage biomass.

If cattle exhibit lower body conditioning scores, prairie forages could be supplemented with higher protein and more digestible feed sources to ensure an adequate diet. Further economic research is needed to understand the costs and benefits of supplementing prairie forage grazing systems.

From an economic standpoint, the scenarios in this study suggest that the best option is to pay a reduced rental fee for grazing public prairie lands, while leaving the responsibility of maintaining the grazing infrastructure to the host organization. Even if the producer is paying the full rental rate, the costs are comparable to investing in infrastructure in order to graze private CRP land. Allowing the governmental or conservation organization to maintain the infrastructure minimizes economic risk for the producer.

Conclusions

Each piece of prairie is different and the interactions that must be considered are plant communities, management goals, history and local environment. When designing and implementing a management strategy that includes grazing, results will vary from location to location. This case study is not meant to fit every situation.

Based on the information gathered here, Whiterock Conservancy has designed a



*Reconstructed prairie
before pasturing*

management strategy to begin grazing in a way that balances agronomic, animal nutrition, economic and ecological considerations. In August 2012, cattle were grazed on a reconstructed prairie for several weeks. The time was selected to avoid grazing during grassland bird nesting season, which ends in July or August. Through this is not the optimal time for high-quality forage production, a large quantity of biomass is available to help maintain livestock body conditioning scores while meeting the ecological goals of Whiterock Conservancy. To address potential nutrient deficiencies, cattle were monitored and if body condition scores began to fall due to insufficient nutrition, grains and higher quality hay were used to supplement prairie forage.

Impact of results

Though prairie grazing is not likely to become a highly profitable venture in Iowa due to lower quality forage resources, this case study suggested that it is possible to maintain economic viability while maintaining or improving ecosystem services. The results have the potential to help both conservation land management and grazers. Conservation lands may be improved by increased diversity and newly altered disturbance regimes. Graziers may benefit by saving money from decreased need to purchase hay, expansion of land base for grazing, and providing time for home pastures to rest while grazing prairie lands.

Graziers and conservation land managers may have different approaches to grazing prairies. Graziers may be more focused on improved cattle body conditioning scores or weight gain. Conservation land managers may be more interested in added diversity and enhanced wildlife habitat. If grazing is implemented as a land management strategy, it will be critical to have considerable early communication between conservation managers and graziers to avoid overgrazing of prairies and compromising of conservation goals or resulting negative impacts on cattle health.

Education and outreach

Publications included an MS Thesis, an article submitted to the *Journal of Renewable Agriculture and Food Systems* and an ISU Extension publication. Rachael Cox gave two presentations on the project findings, one at the Agronomy Society of America meeting in October 2011 and one at an ISU Extension workshop in May 2011..

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Leveraged funds

Several additional grants for more than \$15,000 were received by Rachael Cox, a graduate student working on the project. Among them were an Agronomy Endowment Scholarship, a NCR-SARE Graduate Student Grant, and an NSF Graduate Research Fellowship. The project also received a \$7,000 grant from the Grass-Based Livestock Working Group to create a nutritional grazing calendar.